

Anatoli and Ahovi presented the recent simulation work on understanding the sona-transition optimization data taken in past a few years. It has been observed that the polarization from the source oscillates when varying the correction coil current on both sides of a relative flat region. In this region the polarization actually is slightly higher with higher current, which has been used for operation. What is missing is the simulation to really understand the oscillation structure. Dr. Belov has a code which can calculate the polarization of a single electron atom in an external magnetic field. Recently, Ahovi modified the code to work for a real field distribution and used it to simulate the data. With flat distribution of particles across the beam profile, the oscillation structure is reproduced from simulation. It takes 20 minutes simulation time for each point. The simulation was done for two beam radii: 5mm and 11mm. The real beam radius was estimated from beam scraping as about 10mm. It seems that the 5mm simulation shows better agreement with experimental data. They are going to continue the simulation to check the sensitivity to radius. In the mean time, A graduate student of Dr. Belov is also working on a different simulation approach. Dejan and Thomas asked if the model considered the interaction between particles and the spin exchange effect. Anatoli answered that these effects are not important with the relative low beam density.

Fanglei briefly reported the follow up spin tracking results for vertical polarization profile when crossing 36+ from last week. She checked polarization with 100 particles sitting at $10\pi\mu\text{m}$ rms vertical emittance while varying the vertical tune. It shows that the large polarization loss seen in last week's simulation was due to the chosen vertical tune 8.987. For three higher tunes (8.988, 8.989, 8.99), the polarization level is fine. Haixin pointed out that a higher order snake resonance (6th order!) actually locates at 8.9866. From these simulations, it seems that the vertical polarization profile can be avoided if the vertical tune is chosen properly along the ramp even for the 10% cold snake case. She will do more tracking with lower vertical tunes to confirm that.

Haixin